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PRE-APPEAL BRIEF REQUEST FOR REVIEW		Docket Number (Optional)	
		FIS920040159US1	
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR on _____ Signature _____ Typed or printed name _____	Application Number	Filed	
	10/710,828	08/05/2004	
	First Named Inventor		
	Edelstein		
	Art Unit	Examiner	
	2814	Pizzarro Crespo	
Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.			
This request is being filed with a notice of appeal.			
The review is requested for the reason(s) stated on the attached sheet(s). Note: No more than five (5) pages may be provided.			
I am the			
<input type="checkbox"/> applicant/inventor.		Signature	
<input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)		Marshall M. Curtis	
		Typed or printed name	
<input checked="" type="checkbox"/> attorney or agent of record. Registration number 33,138		(703) 787-9400	
		Telephone number	
<input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____		June 13, 2007	
		Date	
NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.			

☐ *Total of _____ forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Daniel C. Edelstein et al.

Confirmation No.: 4827

Serial No.: 10/710,828

Group Art Unit: No.: 2814

Filed: August 5, 2004

Examiner: M. Pizzarro Crespo

For: COPPER ALLOY VIA BOTTOM LINER

Mail Stop AF

Commissioner for Patents

PO Box 1450

Alexandria, Virginia 22313-1450

ATTACHMENT TO PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

This Pre-Appeal Brief Request for Review is being concurrently filed with a Notice of Appeal. If any additional fees are required to satisfy the fees due for the Notice of Appeal or to gain entry and consideration of this Pre-Appeal Brief Request for Review, the Commissioner is authorized to charge Attorney's Deposit Account 09-0458 of International Business Machines Corporation (E Fishkill).

The Invention

The invention as recited generically in the sole independent claim 1 is directed to an integrated circuit having a particular structure at an interface of a via (a connection structure used between two conductor layers) and a conductor layer which is of much improved strength and reliability with no significant impact on bulk resistance and, moreover, the structure is highly stable metallurgically such that the improved properties do not deteriorate or become subject to defects (which might otherwise occur in the absence of the invention) through many potentially extreme

thermal cycles. These meritorious effects are achieved by a structure which avoids alloying at a via/conductor interface in one direction by means of a barrier and a region of alloy created from a small and closely regulated amount of alloying material such that the alloy region includes “a concentration of alloying material which is *continuously graded from a reaction front where a stoichiometric alloy has been formed and graded mechanical characteristics*, containing a *predetermined quantity of alloying material* and *restricted to an interfacial region* of said metal or metal alloy of said first layer and said metal or metal alloy via *by a barrier layer and by said quantity of alloying material being fully reacted* with said metal or metal alloy of said first layer or said second layer” (claim 1 - emphasis added) which is clearly supported in the original disclosure substantially verbatim, particularly in paragraph [0018] wherein it is stated (emphasis added) that:

“The alloying material layer provides an easily regulated amount of alloying material which is, preferably, entirely reacted with copper to form a graded and thus highly stable alloy composition distribution with stable desired properties. The alloy region also has graded mechanical properties which tends to distribute stresses applied thereto, reducing potential tendencies toward metal fatigue at via/wiring interfaces due to thermal cycling. Typically, the alloying diffusion is limited to at most one diffusion length beyond the reaction front *where a fully stoichiometric alloy has formed*. In many alloying systems such as Cu/Sn or Cu/In bronzes, the resulting alloy also acts as a diffusion barrier against the further penetration of alloying element or copper through the stoichiometrically formed alloy layer.”

Errors and Omissions

The recitations of “having a concentration of alloying material which is continuously graded from a reaction front where a stoichiometric alloy has been formed” was introduced by amendment filed January 18, 2007, and has been entered.

In the final rejection of March 13, 2007, the Examiner responds to this amendatory language by asserting that the amendatory language is insufficiently supported by original disclosure under 35 U.S.C. §112, first paragraph, and indefinite under 35 U.S.C. §112, second paragraph, and maintains the rejection of claims under 35 U.S.C. §103 based on Besser and Lopatin or Besser, Lopatin and Wang; asserting a product-by-process analysis and according no patentable weight to amendatory recitations which define the stable alloy region by its *properties and constitution*. (It is respectfully submitted that neither the recitation set out above nor any other recitation in claim 1 is even arguably a product-by-process recitation.)

In so doing, the Examiner has essentially asserted that since, by their nature, alloys are mixtures rather than compounds, there is no such thing as a stoichiometric alloy and that it follows that the term “stoichiometric” could not be used in its customary and accepted meaning as having exact ratios of constituent materials; thus leaving the term essentially undefined in the specification or claims. Ample evidence to the contrary was presented in the response filed May 14, 2007, to which an article entitled “Stoichiometric and Off-Stoichiometric Alloying in silicide compound Ti_5Si_3 by Nb or Cr Additions” by L. Zhang and J. Wu (additional copy attached) which is clearly evidentiary of the facts that:

1. The term “stoichiometric alloy” is an accepted term of art,
2. The term “stoichiometric alloy” has a meaning of having exact ratios of constituent materials, and
3. The term “stoichiometric” as applied to alloys has exactly the same meaning as applied to compounds. Note especially the comparison of stoichiometric

alloys and off-stoichiometric alloys in the section thereof under the headings of “Experimental Results” and Conclusions”. Note also the terminology (including the phrase “ M_5Si_3 -type compound” in the section of the article entitled “Discussion” and apparently indicating that compounds and alloys are not so different as to preclude stoichiometry in the latter and, by the same token, that alloying is well-described as a “reaction” which would occur from a “reaction front” as disclosed and claimed. Many articles which are similarly evidentiary of the above facts can be found in an internet search for the term “stoichiometric alloy”.

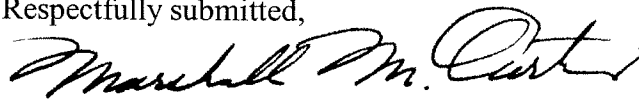
The Examiner, in the Advisory Action mailed May 29, 2007, substantially maintains the position stated in the final rejection and *does not mention the cited article or the remarks provided in connection therewith*. However, the Examiner appears to assert, as further support for that position, that no exact ratio of constituent materials is disclosed for the stoichiometric alloy. In response thereto, it is respectfully pointed out that the language of the original disclosure clearly indicates that the alloy formed at the reaction front *will be* stoichiometric as is, in fact, the case, as would be recognized by those skilled in the art. Therefore, such a further observation by which the Examiner apparently seeks to buttress the asserted grounds of rejection is entirely illusory.

Conclusion

It is respectfully submitted that ample evidence clearly indicating the error in the Examiner’s position in regard to all asserted grounds of rejection is already in the record while the Examiner has given no indication that such evidence has been considered. It is clear that “stoichiometric alloy” is a well-understood term of art and uses the term stoichiometric to convey precisely the same meaning as is to be found in virtually any standard English dictionary: that constituent materials are present in exact ratios. Therefore, it is clear that ample support for the amendatory language is

presented and no ambiguity is presented by the amendatory language or the terms “stoichiometric” or “stoichiometric alloy”. Moreover, the Examiner has not shown that the applied references answer the amendatory recitation of the claims or even asserted that they do but, rather, appears to have sought to justify such omission through assertion of a product-by process analysis while no recitations of claim 1 are even arguably process recitations but define *structure* by its *properties and constitution*. Accordingly, it is respectfully submitted that, on the record, all asserted grounds of rejection are clearly in error and untenable while the Examiner has given no indication that evidence clearly indicative of such errors has been considered. In view of the above, it is requested that the position of the Examiner be reviewed, that the grounds of rejections be withdrawn, and that the application be passed to issue.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Marshall M. Curtis", with a stylized flourish at the end.

Marshall M. Curtis
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